

REMARKS

It is noted that the claim amendments herein are intended solely to more particularly point out the present invention for the Examiner, and not for distinguishing over the prior art or the statutory requirements directed to patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Claims 1-54 are all of the claims pending in the present Application. New claims 53 and 54 are added. Claims 19-24, 43-48, 50, and 52 stand rejected under 35 USC §112, second paragraph, as being indefinite. Claims 1-52 stand rejected under 35 USC §103(a) as unpatentable over Applicant's Admitted Prior Art (APA), further in view of US Patent 5,689,282 to Wolfs et al.

These rejections are respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

As described and claimed, for example by claim 1, the present invention addresses a method for driving a liquid crystal display in which a liquid crystal cell is mounted at an intersection of each of a plurality of scanning electrodes placed at specified intervals in a row direction and each of a plurality of signal electrodes placed at specified intervals in a column direction, by sequentially feeding scanning signals to the plurality of scanning electrodes and by sequentially feeding data signals to the plurality of signal electrodes. A polarity of each of the data signals is reversed for every 2n (n is a natural number) pieces of the scanning electrodes. Data signals are concurrently reversed for every other signal electrode in the liquid

crystal display. The data signals having the reversed polarity are sequentially fed to each of the corresponding signal electrodes.

This concurrent polarity reversal in both the horizontal and vertical dimensions cause the flicker to occur at a slant, rather than vertically or horizontally, as in the prior art of record. The slant flicker is less noticeable to the observer. Therefore, flicker is reduced.

The advantages provided by claimed combination of the present invention include the following: reduction of cost; reduction of monochromatic flicker and flicker for display of images with non-white colors; and capability to minimize flicker over the entire screen, thereby preventing image persistence and allowing application to high-definition displays and larger displays.

II. THE 35 USC §112, SECOND PARAGRAPH, REJECTION

Claims 19-24, 43-48, 50, and 52 stand rejected under 35 U.S.C. §112, second paragraph. It is unclear exactly what the Examiner considers as being indefinite when the claim wording is viewed as having been interpreted by one of ordinary skill in the art.

That is, as best understood, the Examiner objects to the terminology "first polarity" and "second polarity". However, it is well known in the art that there are only two polarities, i.e., negative polarity and positive polarity.

In the present invention, it does not matter whether the "first polarity" is positive and the "second polarity" is negative, or vice versa, since Figure 9 shows that both polarities are based upon a highest potential (relative to V_{COM}) signal (e.g., V_{PH} , V_{MH}) that is based on the minimum transmittance of the display cell. The lowest potential (relative to V_{COM}) signal (e.g., V_{PL} , V_{ML}) is based on the maximum transmittance, and the intermediate potential (e.g., V_{PM} ,

V_{MM}) is a potential level intermediate between that corresponding to the maximum and minimum transmittance.

Applicant, therefore, respectfully disagrees with the Examiner that one of ordinary skill in the art would in any way be confused by the terminology of claims 19, 43, 50, and 53, but has further clarified the wording in these claims in a good faith attempt to expedite prosecution.

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

III. THE PRIOR ART REJECTION

The Examiner alleges that the present invention, as defined by claims 1-52, is rendered obvious by the Applicant's Admitted Prior Art (APA), further in view of US Patent 5,689,282 to Wolfs et al. The Examiner is understood as conceding that the APA fails to teach or suggest a "circuit for reversing a polarity of each of the data signals for every $2n$ piece[s] of the scanning electrodes and for every the signal electrode in the liquid crystal display."

To overcome this alleged deficiency in the APA, the Examiner relies on Wolfs and alleges that Wolfs "discloses a display device having a row selection circuit 13 that can reverse a polarity of the data signals for every 2 rows or n rows (double line inversion [i.e., $n = 2$])(see Fig. 3)."

Applicant respectfully submits that the rejection of record suggests that the Examiner is somewhat confused about the significance of the present invention and how it differs from the APA.

First and foremost, it is unclear exactly what the rejection of record is attempting to

say. It is understood that the Examiner relies upon the APA of Figure 12 to demonstrate the LCD configuration of the independent claims. But beyond that point, Applicant does not understand the Examiner's argument.

That is, in spite of the Examiner's characterization, Applicant respectfully submits that the APA already incorporates a polarity reversal scheme to reduce flicker and that the Examiner will totally destroy that scheme by merely superimposing another scheme, such as shown in Wolfs, onto that of the APA. There is clearly no need to do so, thereby clearly evidencing the Examiner's use of impermissible hindsight reconstruction.

That is, as shown in Figures 13A/13B and described beginning at line 1 of page 4, the first APA technique has a delta reversing driving method oriented towards a delta pixel arrangement. As described at lines 1-3 of page 5, this scheme reduces the flicker for white colors.

If the technique in Wolfs is merely superimposed on this pattern, as the Examiner urges, this reduction in flicker for white colors will be destroyed. Additionally, the Examiner will have now introduced the horizontal stripes that plague the horizontal-row-inversion upon which Wolfs is based (see column 1 at lines 34-37). The Examiner seems to forget that Wolfs actually teaches a technique that overcomes these horizontal stripes. Thus, if anything, Wolfs actually teaches against using a horizontal-row-inversion technique, since Wolfs itself clearly teaches that such inversion creates horizontal stripes that must be overcome.

Applicant points out that a key aspect and aim of the present invention is that of reducing flicker for non-white colors (e.g., monochromatic color images). As clearly shown in Figures 15A/15B, the first APA suffers from the problem of flicker causing vertical lines because the two polarities cause two different currents.

By slanting the flicker that would normally occur during monochromatic images, the flicker is reduced for the human visual system. This slanting is done by combining polarity reversal in a specific method in both the horizontal dimension and the vertical dimension. Neither the first APA nor Wolfs suggests the specific combination of polarity reversal of the independent claims, which combination allows the monochromatic color image flicker to be slanted.

A similar argument applies for the second APA shown in Figures 14A/14B, in that the superimposition of Wolfs onto this existing polarity reversal scheme would totally destroy the existing method of reducing flicker, as described beginning at line 28 of page 5. That is, the Examiner would merely introduce the horizontal stripes described in Wolfs at lines 34-37 of column 1.

Thus, the combination of Wolfs into either the first APA or the second APA will destroy the respective scheme that is already used to reduce flicker and would additionally introduce the horizontal stripes that Wolfs in fact attempts to remove. For this reason alone, this urged combination is improper under the guidelines of MPEP 2143.01 ("The mere fact that reference can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.")

The present invention provides at least the advantages of reduction of cost, reduction

of monochromatic flicker and flicker for display of images with non-white colors, and capability to minimize flicker over the entire screen, which reduces image persistence and allows application to high-definition displays and larger displays.

Hence, turning to the clear language of the claims, there is no teaching or suggestion of "... reversing a polarity of each of said data signals for every $2n$ (n is a natural number) pieces of said scanning electrodes and for every said signal electrode in said liquid crystal display."

Therefore, claims 1, 13, 25, 37, 49, 51, and new claims 53 and 54 are clearly patentable over ARA. Claims 2-6, 14-18, 26-30, and 38-42 would also be patentable, if for no reason other than dependency.

Additionally, Applicant respectfully disagrees that the rejection of record meets the burden of a *prima facie* rejection under 35 USC §103 for claims 7, 31, and 50.

Relative to claim 7, the rejection of record alludes to page 5 of the specification but fails to explain how anything on this page meets the precise definition of the claims. That is, the present invention describes a waveform covering four consecutive scanning periods characterized by two polarities and four potentials. There is no description on page 5 of such waveform.

Hence, turning to the clear language of the claims, there is no teaching or suggestion of: "... by reversing a data signal that changes, relative to a common potential being applied to one terminal of all said liquid crystal cells and during four consecutive scanning periods, sequentially into a first signal having a first potential of a first polarity and a second signal having a second potential of said first polarity and into a first signal having a first potential of a second polarity and a second signal having a second potential of said second polarity", as

required by claim 7. Claims 31 and 50 have similar wording.

Therefore, claims 7, 31, and 50 are fully patentable over APA, and claims 8-12 and 32-36 are patentable, if for no reason other than dependency.

Finally, Applicant also respectfully disagrees that the rejection of record meets the burden of a *prima facie* rejection under 35 USC §103 for claims 19, 43, and 52.

Relative to claim 19, the Examiner adds a hardware description from Wolfs. However, the rejection of record ignores the details of claim 19, wherein is described a waveform covering four consecutive scanning period and four specific potentials. Wolfs fails to teach, suggest, or even hint at this waveform.

Hence, turning to the clear language of the claims, there is no teaching or suggestion of: "... said data signal comprising a waveform defined during four consecutive scanning periods, said data signal waveform comprising combinations of: a first signal having a first potential of a positive polarity, said first potential corresponding to an intermediate transmittance between a maximum transmittance and a minimum transmittance of said liquid crystal cell; a second signal having a second potential of said positive polarity, said second potential corresponding to said minimum transmittance of said liquid crystal cell; a third signal having a third potential of a negative polarity, said third potential corresponding to said intermediate transmittance between said maximum transmittance and said minimum transmittance of said liquid crystal cell; and a fourth signal having a fourth potential of said negative polarity that corresponds to said minimum transmittance of said liquid crystal cell", as required by claim 19. Claims 43 and 52 have similar wording.

Therefore, claims 19, 43, and 52 are fully patentable over APA, and claims 20-24 and 44-48 are patentable, if for no reason other than dependency.

For the reasons above, the claimed invention is fully patentable over the cited prior art.

Further, the other prior art of record has been reviewed, but it too, even in combination with APA and Wolfs, fails to teach or suggest the claimed invention.


IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-54, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,



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